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ADDITIONAL NOTES ON SONCHUS ULIGINOSUS

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The distribution of *Sonchus uliginosus* in the Philadelphia region has been well recorded by Mr. Bayard Long in a recent contribution* but during the past season additional collections and observations relating especially to its economic status and identity have been made that seem worthy of note. Since it was first collected in 1917 it has not only been found in many new localities but it has been observed appearing in areas familiar through field work. This season of 1922 collections have been made from eight new areas (not before reported) and there still remain to be visited other *Sonchus* stations observed while enroute on passing trolley cars. Though in some stations it has been observed to persist for years and apparently spread during this time, often in spite of cultivation, it is yet too early to very definitely note its spread in the region, or even in specified local areas.

It has already been noted† that the *Sonchus* spreads by long horizontal roots and some opportunity was had to note something of its behavior in this respect. On July 23 the underground parts of the *Sonchus* were examined in a fallow field where corn had been growing the season before. It was difficult to follow roots in the stiff soil with a botanical trowel but one root was followed for slightly over thirty inches from a rosette, after which a much thinner root was followed about five inches, when it was lost in digging. This root was about two to four inches from the surface and was unbranched. In

* *Sonchus uliginosus* occurring in the Philadelphia Area, Bayard Long, Torreya, Vol. 22, No. 6, p. 91.

† New records and other notes on North Dakota plants, O. A. Stevens, Torrey Bulletin, Vol. 49, No. 4, p. 102.

digging, roots were found to cross each other and one was noted from which, close to the surface, two plants arose slightly more than an inch apart.

On October 8 a very large grass field, unmowed this season, was visited. In this field the *Sonchus* was extremely abundant throughout. A part of this field had been burned over and in this area, where the ground had been cleared of old growth, it was now quite green in places with the abundant fresh vegetative growth of the *Sonchus*. This growth was variously disposed in isolated rosettes or groups obviously related to the same individual root system. Some of these fresh plants were collected and have yielded some interesting information. For instance, five plants were found to show above the surface from an association of roots that when pressed measured three inches in diameter and two of these arose within the space of ¼ inch. (In the adjoining cornfield earlier in the season three robust, mature plants arising from a vertical shoot were as close to each other as this.) Horizontal roots were abundantly present and varied in thickness but those observed averaged little thicker than ⅛ inch in diameter and often less. One root of over a foot in length between rosettes was found to be almost threadlike at the points of attachment and normally thickened toward the centre. The roots seem to be plentifully supplied with buds and at times appear quite "knobby" with them. These protuberances that become growing buds were less evident on the roots noted in July so that it is quite possible that they may develop best toward the end of the season. On one horizontal root five buds were found starting from one side of a root with two on the other within the space of 1¼ inches. A space of 2 inches would have included several more. With such conditions it is not surprising that six separate plants were found that had reached the surface within the space of 1¼ inches or eight within about 4¼ inches.

Through the courtesy of Mr. A. S. Weibel, on October 29, several holes were dug about a grass and alfalfa field on his farm, in the Saucon valley, where the *Sonchus* has persisted for several years. The soil here is very stiff and clayey and it was extremely difficult to follow roots through it without severing them and losing sure connection. The usual network of roots was found with rosettes variously disposed, but one horizontal

root was followed for about 27 inches from a rosette to a severed end, and another bore two rosettes on vertical shoots 18 inches apart. What determines this variability in the position of rosettes on roots was not apparent but it was observed that a horizontal root may reach close to the surface, bear a rosette without any apparent vertical shoot, and continue on. Possibly depth may have something to do with it, for the often abundant roots at varying depth usually seemed to be plentifully supplied with buds. On one root 27 buds were counted within a space of 6 inches and this did not include all protuberances that may be assumed to be buds. One root had 14 actively pushing buds within a space of 6 inches. One vertical shoot with rosette had five such growing buds within the space of an inch.

No roots were found to penetrate deeper than 7 inches and most were not so deep. Thus the depth to which roots may extend—and presumably escape the plough—has not been carefully observed but the plant appears to be well able to spread rapidly whether disturbed or not by cultivation. Each piece of root cut in cultivation is presumably well fitted to "carry on," if not buried too deep or exposed too much. A good example of the rapidity with which the plant may spread and occupy an area was noted at the Weibel farm where a strip of the field was planted with raspberry bushes and recently cultivated. The rosettes of the *Sonchus* here practically covered most of the surface at places. (Elsewhere in recently-seeded fields it has been observed to be sending up fresh rosettes with growing crops.) It would be interesting to know whether single colonies of this plant in undisturbed situations really represent more than one individual plant. This was strongly suggested by one such colony, more or less circular in outline, observed in a grass field. The often uneven distribution in fields where the plant is abundant also suggests this. At the Weibel farm the *Sonchus* has proven to be very troublesome and it is obvious that a plant with such characteristics as here noted easily may become one of the most persistent of weeds.

A most interesting point that has arisen in the local observation of the plant concerns its proper identity. There are present in the local area two types of perennial *Sonchus* that appear to differ only in the presence or absence of glandular hairs on the inflorescence and its branches. Only one collection of the plant

with glandular hairs had been made up to 1921. At that time it was referred to *S. arvensis*. Recent examination, however, of the series of *S. arvensis* from the Old World and America at the Academy of Natural Sciences of Philadelphia gave the impression that this plant could not be satisfactorily identified with that species. This is evidently a matter for diagnosis by some student of *Sonchus* and the observations here noted are merely intended as suggestions that may be helpful in such a study of the plant.

This season additional glandular material was discovered locally and in one case both types were found growing together. This led to a visit to the locality where it was first collected to discover whether any of the glabrous type might be present with the glandular. A part of this area was freshly ploughed but the plant was found along the roadside—abundantly at places, especially along the sides of the road adjacent to the fields—for a distance of over half a mile, and also in part of the area previously visited (now planted in corn). The area of occupancy in the fields here is apparently not coextensive with that of the roadside. No *Sonchus* with glabrous heads was found. The glandular heads were so distinct that identification at sight was easy. There were few, if any, plants along the roadside embankments, etc., that had not grown to maturity after the roadsides had been mowed and these mostly showed glabrous branches of the inflorescence with bracts on the pedicels bearing one to few glandular hairs or none.

Westward along the highway, about 800 feet from the apparent limit of occurrence of the glandular plant, it was with considerable surprise that a large field was noted that was yellow with the bloom of *Sonchus*. This field, which extends for about 800 feet along the highway, is of even greater depth. In a walk around this field among hundreds, and more probably thousands, of blooming *Sonchus*, none was found that was not of the glabrous type. This grass field was not mowed this season and doubtless this was responsible for the mostly rank vegetative growth as well as for the abundant bloom. In a cornfield adjoining and along its edge adjacent to the grass field, plants occurred that were especially robust and vigorous owing, probably, to the benefits of cultivation. Several of these latter plants in the cornfield were between 6 and 6½ feet high. (Later in the season some were noted to reach even 7 feet or over.)

That these large areas of different types should exist independently so near to each other is interesting. None of the glabrous type was noted along the roadside but an isolated occurrence of the glandular type was found beside the road opposite the cornfield, where the glabrous type grew among the corn—an extension, doubtless, from the glandular type of abundance along the road further east. A small colony, perhaps 10 or 15 feet south of the fence line of the field of glandular plants (the only one noted in this large, weedy, fallow field) suggested that it might have been introduced as easily through long travelling roots as from seed. The apparent absence of the *Sonchus* from fields closely adjacent to such areas of great abundance is always interesting and suggests a field for observation concerning the rapidity of occupancy through root agency and the probable spread through seed.

Though plants of both types vary in height according to conditions, they normally appear to be tall-growing plants. Three plants of a colony of the glandular type, collected in a weedy, semi-open situation in a denuded woodland close to a highway, measure respectively 58, 64 and 67 inches in height, and some plants in a cornfield were observed that were over 6 feet in height. Plants of the glabrous type in a cornfield, as already noted, were observed to be even taller. Some material of the glabrous type collected measured in even inches respectively 27, 29, 29, 30, 31, 34, 34, 36, 37, 38, 40, 41, 42, 44, 45, 46, 48, 52, 55, 61, 61 inches in height. Some of these plants grew to late maturity in mowed areas and are lower than the average. Two plants of such late growth of the glandular type, collected along a mowed roadside, measure respectively 25 and 26 inches in height. In one field (unmowed this season) many plants of the glabrous type were found with vigorous growth above prostrate dried growth of other species, especially Red Clover. It was found that these plants had a stem, bare of leaves, that lay prostrate with the dried growth. Many of these plants were in bloom and three of them, collected, measure respectively 54, 49 and 47 inches in height, including the bare prostrate stem of respectively 22, 19 and 16 inches.

The expanded heads of both types are very showy and of a bright yellow color, opening early in the day and closing in the afternoon, at least on clear days. It was not found possible to

make any distinction in color between the two types. Several of the larger expanded heads from robust plants of the glabrous type, growing in a cornfield late in the season, were found to measure from 1½ to 1⅝ inches across—or even more in some cases. No glandular type heads of similar robust plants being available, those of fresh late roadside growth were measured and were found to be slightly less than 1½ inches across. Closed involucres of the glabrous type with petals dropped and tapering to a blunt point from a rounded "knobby" base were found to be about 9/16 inch high with a width at the rounded "knobby" base of about 5/16 inch. Enough such heads were fitted to a scale drawn in a notebook to indicate that this was a fairly close average for maximum size mature heads. Unopened buds varied with age and were blunt. Heads from the glandular type approximated the same average measurements. The involucre of both types is rather light green even in pressed material, unless badly cured in pressing.

Heads of the glandular type appear always to have glandular hairs plentifully present over the involucre, and glandular hairs, at times sparingly or abundantly, have been noted to extend along the branches of the inflorescence as far as 6 to 7 inches below the tops of the heads. The absence of glandular hairs on the branches of the inflorescence in many plants of late growth of the glandular type has already been noted. Plants of the glabrous type appear to be quite destitute of glandular hairs but in all material examined sticky dots, usually roundish in outline, are present in varying abundance along the edge of the involucral bracts of the heads (even in bud) as well as elsewhere on the surface. These "gummy" or sticky dots have been noted to cause heads of the glabrous type to stick slightly to the paper in pressing. They have also been noted on material of the glandular type but more rarely and it is possible that they represent excrescences caused through puncture by sucking insects.

Achenes of the glabrous type examined were brown in color, oblong, slightly tapering, compressed and with 12 heavy longitudinal, rugose ribs. Those of the glandular type examined appear to be quite similar.

It is hoped that the above observations may be found helpful in a study of this plant. Material representing all collections

is in the Herbarium of the Academy of Natural Sciences of Philadelphia.

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SHORTER NOTES

A Woodland Plant That Is Becoming A Grainfield Weed

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It is rather an uncommon occurrence for woodland species to acquire the habit of invading field crops but this strange situation is presented by *Phacelia purshii* in Indiana.

The species is found in abundance in open woods in many parts of the state and botanists usually record the occurrence of the plant in "moist woods and thickets." During April, 1922, County Agent D. D. Ball of Rush County, Indiana, sent a specimen of *Phacelia purshii* for identification with the statement that, in one part of his county, "there are about 500 acres of clover and wheat infested by this plant, which is a serious pest. The wheat especially will not grow in patches infested by the weed."

A few days later another specimen of the same species was received from W. A. Crutz, manager of the Imperial Mills of Cambridge City, Indiana, with the statement that "this plant was brought into my place of business and is a new one in this locality. It is noted among farmers for its damage to wheat and oats. It grows best on sandy loam and on river bottom land. One farmer is now planning on mowing a field of oats that is so badly infested that the oats are being choked out by the weed."

The next report of the occurrence of this new weed came from County Agent A. J. Hesler of Fountain County, Indiana. He stated that the weed "has lavender flowers that bloom about May 30. It is a very bad weed, especially on the Hayes farm in this county where it is dominating a field of oats."

The identification was verified by the Office of Economic and Systematic Botany of the United States Department of Agriculture. Since the various reports suggest that the species is a potentially dangerous weed, a picture of the plant together with